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National Priority Chemicals Trends Report (2000-2004)

Section 4
Chemical Specific Trends Analyses for Priority Chemicals (2000−2004): Trifluralin

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Trifluralin

Chemical Information:

Trifluralin is a yellow−orange crystalline solid

CAS Number − 1582−09−8

Alternate Names − 2,6−dinitro−N,N−dipropyl−4−(trifluoromethyl)−benzamine, benzeneamine

General Uses − Trifluralin is an herbicide used primarily on cotton and soybean crops. Production of trifluralin has declined since restrictions on product formulation were implemented in 1982 due to carcinogenicity and mutagenicity concerns. It is used on soybean crops, cotton, wheat, alfalfa, sunflowers and many other crops.

Potential Hazards − Trifluralin is an irritant of the eyes and skin. It emits toxic fumes of fluorine and nitrogen oxides when heated to decomposition and has potential liver toxicity and blood effects (EPA Integrated Risk System −−IRIS).

Summary Analysis:

- NATIONAL: In 2004, only nine facilities reported approximately 82,000 pounds of trifluralin. Compared to the quantity reported in 2000, there was a decrease of approximately 6,600 pounds or 7.5 percent. One facility reported nearly 76 percent of the total quantity.
- REGIONAL: In 2004 facilities in only four of the regions reported trifluralin. Facilities in Region 7 reported 84 percent of the total quantity.
- STATES: For 2000−2004, facilities in 14 states reported trifluralin; by 2004 only facilities in five of these states reported this chemical. One facility in Iowa accounted for 76 percent of the total quantity of this chemical in 2004.
- MANAGEMENT: Since 2000, most of the trifluralin was treated.
- INDUSTRY SECTOR: Facilities in only three industry sectors reported trifluralin in 2004. Facilities in SIC 2879 (Pesticides and agricultural chemicals, nec) reported 97 percent of the trifluralin.

National Trends:

Exhibit 4.254 shows the number of facilities that reported trifluralin in 2000 to 2004 and the quantities that were managed via disposal, treatment, energy recovery, and recycling. In 2004, only nine facilities reported approximately 82,000 pounds of trifluralin. Compared to the quantity reported in 2000, there was a decrease of approximately 6,600 pounds or 7.5 percent. Compared to the quantity reported in 2003, the quantity increased significantly, by approximately 24,000 pounds or by approximately 42 percent. The number of facilities that reported trifluralin in 2004 decreased by 40 percent compared to the number of facilities that had reported trifluralin in 2000−2003.

Since 2000, most of the trifluralin was treated. Since 2003, disposal of trifluralin has been decreasing; in 2004, 78 percent less trifluralin was disposed than in 2000. No quantity of trifluralin was sent to energy recovery. Since 2000, only relatively small quantities of trifluralin were recycled, including only 81 pounds in 2004.

Exhibit 4.254. National Management Methods for Trifluralin, 2000−2004

Management Methods for Trifluralin and Number of Facilities	2000	2001	2002	2003	2004	Percent Change (2000−2004)	Management Method − Percent of Quantity of This PC (2004)
Number of Facilities	15	16	15	14	9	−40.0%	-
Disposal Quantity (pounds)	11,030	13,193	12,167	5,634	2,444	−77.8%	3.0%
Energy Recovery Quantity (pounds)	0	0	0	0	0	NA	0.0%
Treatment Quantity (pounds)	77,227	79,670	50,377	51,758	79,224	2.6%	97.0%
Priority Chemical Quantity (pounds)	88,257	92,863	62,544	57,392	81,668	−7.5%	-
Recycling Quantity (pounds)*	2,000	2,001	5,675	159	81	−95.9%	-

*Note: Waste minimization is the emphasis of this Report. As such, we primarily focus on quantities of PCs that are managed via onsite/offsite disposal, treatment, or energy recovery because we believe these PC quantities offer the greatest opportunities for waste minimization. Because recycled quantities of PCs are already directed to their best uses, they are considered separate and distinct from the quantities of PCs not recycled. Throughout this section, the recycled quantity is presented for the purpose of providing some perspective regarding the quantity of this PC already recycled compared to the quantities that are managed via disposal, treatment, and energy recovery and thus potentially available for waste minimization.

Exhibit 4.255 shows the number of facilities that reported trifluralin within various quantity ranges. Of the nine facilities that reported trifluralin in 2004, one facility reported nearly 76 percent of the total quantity. Five of the facilities reported 99 percent of the total quantity.

Exhibit 4.255. Distribution of Quantities by Facilities Reporting Trifluralin, 2004

Trifluralin (81,668 pounds)		
Quantity Reported	Number of Facilities Reporting This Quantity (2004)	Percent of Total Quantity of This PC (2004)
up to 10 pounds	0	0.0%
11 − 100 pounds	2	0.2%
101 − 1,000 pounds	2	1.0%
1,001 − 10,000 pounds	4	23.2%
10,001 − 100,000 pounds	1	75.6%
100,001 − 1 million pounds	0	0.0%
> 1 million pounds	0	0.0%

EPA Regional Trends:

Exhibit 4.256 shows the quantity of trifluralin reported in seven EPA regions by facilities in 2000 to 2004.

Some observations include:

- In 2004 facilities in only four of the regions reported trifluralin.
- Facilities in Region 7 reported 84 percent of the total quantity. Compared to quantities reported in 2000, Region 7 facilities reported a decrease of approximately 17,000 pounds or approximately 20 percent in 2004; compared to 2003, however, an increase of approximately 21,000 pounds or 45 percent was reported. Most of the increased quantity in 2004 was attributed to increased production of a herbicide at one of the Region 7 facilities. One facility likewise reported most of the increase reported in 2004 for Region 6; this facility produced a new herbicide in 2003 and increased its production in 2004.

Exhibit 4.256. Regional Quantity of Trifluralin, 2000−2004

EPA Region	2000 (pounds)	2001 (pounds)	2002 (pounds)	2003 (pounds)	2004 (pounds)	Percent Change in Quantity (2000−2004)	Percent of Total Quantity of This PC (2004)
2	0	206	0	0	0	NA	0.0%
4	872	10,415	5,764	464	556	−36.2%	0.7%
5	1,159	713	1,886	3,228	2,569	121.7%	3.1%
6	0	1	2	6,522	10,000	NA	12.2%
7	85,608	80,530	54,272	47,178	68,543	−19.9%	83.9%
9	375	998	620	0	0	−100.0%	0.0%
10	243	0	0	0	0	−100.0%	0.0%
Total	**88,257**	**92,863**	**62,544**	**57,392**	**81,668**	**−7.5%**	**100.0%**

Exhibit 4.257 shows how facilities managed trifluralin, by EPA region, in 2004. Overall, approximately 97 percent of the trifluralin was treated, of which 91 percent was offsite. Facilities in EPA Regions 4, 6, and 7 primarily used this management method. One facility in EPA Region 5, which accounted for the majority of the Region 5 quantity of trifluralin, sent 100 percent of its trifluralin to offsite disposal. In 2004, no trifluralin was sent to energy recovery and very little recycling of trifluralin was reported.

Exhibit 4.257. Regional Management Methods for Trifluralin, 2004

EPA Region	Quantity (pounds) of Trifluralin (2004)	Percent of Total Quantity of Trifluralin (2004)	Disposal (pounds)		Energy Recovery (pounds)		Treatment (pounds)		Recycling (pounds)	
			Onsite Disposal	Offsite Disposal	Onsite Energy Recovery	Offsite Energy Recovery	Onsite Treatment	Offsite Treatment	Onsite Recycling	Offsite Recycling
4	556	0.7%	0	0	0	0	0	556	0	0
5	2,569	3.1%	0	2,444	0	0	76	49	81	0
6	10,000	12.2%	0	0	0	0	4,600	5,400	0	0
7	68,543	83.9%	0	0	0	0	0	68,543	0	0
Total	**81,668**	**100.0%**	**0**	**2,444**	**0**	**0**	**4,676**	**74,548**	**81**	**0**

State Trends:

From 2000 to 2004, facilities in 14 states reported trifluralin; by 2004 only facilities in five of these states reported this chemical. Exhibit 4.258 shows the quantity of trifluralin that was reported by facilities in these five states, between 2000 and 2004. Some highlights include:

- One facility in Iowa accounted for 76 percent of the total quantity of this chemical in 2004. Compared to quantities reported in 2000, this facility reported approximately 41,000 fewer pounds of trifluralin in 2004. However, it reported an increase of approximately 29,000 pounds compared to the 2003 quantity. The facility attributed most of the increased quantity to increased production of a herbicide in 2004.
- In Texas, one facility accounted for the increased quantity of trifluralin in 2003 and 2004. This facility produced a new herbicide in 2003 and increased its production in 2004.
- The decrease of approximately 5,000 pounds in Missouri was mostly due to a decrease in the production of a herbicide at one facility.

Exhibit 4.258. State Quantity Trends for Trifluralin, 2004

State	Total Quantity (pounds) of Trifluralin					Change in Quantity (2000−2004)	Percent Change in Quantity (2000−2004)	Percent of Total Quantity of This PC (2004)
	2000	2001	2002	2003	2004			
IA	66,091	65,187	19,519	33,267	62,021	−4,070	−6.2%	75.9%
TX	0	1	2	6,320	10,000	10,000	NA	12.2%
MO	11,493	6,543	25,953	11,511	6,522	−4,971	−43.3%	8.0%
OH	1,154	713	1,886	3,211	2,569	1,415	122.6%	3.1%
MS	872	80	178	464	556	−316	−36.2%	0.7%
Total	**79,610**	**72,524**	**47,538**	**54,773**	**81,668**	**2,057**	**2.6%**	**100.0%**

Exhibit 4.259 shows how facilities in these five states managed trifluralin in 2004. Facilities in four of these five states used treatment, mostly offsite, to manage trifluralin. One facility in Ohio sent all of its trifluralin to offsite disposal; this same facility reported the entire quantity of recycled trifluralin in 2004.

Exhibit 4.259. State Management Methods for Trifluralin, 2004

State	Total Quantity of Trifluralin (2004)	Onsite Disposal (pounds)	Offsite Disposal (pounds)	Onsite Energy Recovery (pounds)	Offsite Energy Recovery (pounds)	Onsite Treatment (pounds)	Offsite Treatment (pounds)	Onsite Recycling (pounds)	Offsite Recycling (pounds)
IA	62,021	0	0	0	0	0	62,021	0	0
MO	6,522	0	0	0	0	0	6,522	0	0
MS	556	0	0	0	0	0	556	0	0
OH	2,569	0	2,444	0	0	76	49	81	0
TX	10,000	0	0	0	0	4,600	5,400	0	0
Total	**81,668**	**0**	**2,444**	**0**	**0**	**4,676**	**74,548**	**81**	**0**

Industry Sector (SIC) Trends:

From 2000 to 2004, facilities in seven industry sectors reported trifluralin; by 2004, facilities in only three of the industry sectors reported this chemical. Exhibit 4.260 shows the quantity of trifluralin reported by facilities in these three industry sectors from 2000 to 2004. In 2004, facilities in SIC 2879 (Pesticides and agricultural chemicals, nec) reported 97 percent of the trifluralin. One of the seven facilities in this industry sector reported 76 percent of the national total quantity of trifluralin in 2004. This facility accounted for most of the increase of approximately 28,000 pounds in 2004.

Exhibit 4.261 shows how facilities in these three industry sectors managed trifluralin in 2004. Facilities in SIC 2879 (Pesticides and agricultural chemicals, nec) treated trifluralin, mostly (94 percent offsite). The facility in SIC 2875 (Fertilizers, mixing only) sent all of its trifluralin to offsite disposal; this facility also reported the only quantity (81 pounds) of trifluralin recycled in 2004. The facility in SIC 2032 (Canned specialties) used both onsite and offsite treatment for its trifluralin.

Exhibit 4.260. Industry Sectors Containing Trifluralin, 2004

Primary SIC	SIC Description	Number of Facilities That Reported Trifluralin (2004)	2000 (pounds)	2001 (pounds)	2002 (pounds)	2003 (pounds)	2004 (pounds)	Change in Quantity (2000−2004)	Percent of Total Quantity of This PC (2004)
2879	Pesticides and agricultural chemicals, nec	7	78,589	82,373	50,677	51,402	79,139	550	96.9%
2875	Fertilizers, mixing only	1	1,186	1,067	2,636	3,014	2,444	1,258	3.0%
2032	Canned specialties	1	105	96	86	95	85	−20	0.1%
Total		**9**	**79,880**	**83,536**	**53,399**	**54,511**	**81,668**	**1,788**	**100.0%**

Exhibit 4.261. SIC Management Methods of Trifluralin, 2004

Primary SIC	SIC Description	Total Quantity of Trifluralin (2004	Percent of Total Quantity (2004)	Disposal (pounds)		Energy Recovery (pounds)		Treatment (pounds)		Recycling (pounds)	
				Onsite Disposal	Offsite Disposal	Onsite Energy Recovery	Offsite Energy Recovery	Onsite Treatment	Offsite Treatment	Onsite Recycling	Offsite Recycling
2879	Pesticides and agricultural chemicals, nec	85	96.9%	0	0	0	0	76	9	0	0
2875	Fertilizers, mixing only	2,444	3.0%	0	2,444	0	0	0	0	81	0
2032	Canned specialties	79,139	0.1%	0	0	0	0	4,600	74,539	0	0
Total		**81,668**	**100.0%**	**0**	**2,444**	**0**	**0**	**4,676**	**74,548**	**81**	**0**